WHAT WE CLAIM IS:

1. An antenna for use in a sectorized cellular communication system, said antenna comprising

a wide-flare pyramidal horn having two pairs of opposed flared walls, at least one of said two pairs of opposed walls having corrugated interior surfaces, the length of said horn and the flare angle of said walls having said corrugated interior surfaces being selected to produce a ratio Δ_e/λ greater than 1.5, where $\Delta_e = [a/2/\lambda] \tan(\alpha_e/2)$ is the spherical-wave error of said horn, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, a is the aperture width and α_e is the horizontal half-angle of the horn.

2. The antenna of claim 1 wherein said ratio Δ_e/λ is greater than 2.

3. The antenna of claim 1 wherein said ratio Δ_e/λ is greater than 2.5.

4. The antenna of claim 1 wherein the E-plane walls of said horn are corrugated.

5. The antenna of claim 1 wherein the H-plane walls of said horn are corrugated.

6. The antenna of claim 1 wherein both the E-plane walls and the H-plane walls of said horn are corrugated.

7. The antenna of claim 1 wherein said corrugations are substantially perpendicular to the flared walls of the horn in which they are formed.

8. The antenna of claim 1 wherein said corrugations are substantially perpendicular to the horn axis.

9. The antenna of claim 1 which includes a rectangular waveguide connected to the small end of said horn, said waveguide optionally having stepped interior surfaces.

10. The antenna of claim 1 wherein said horn is dimensioned and shaped to produce specified azimuth and elevation beam widths and patterns, the azimuthal pattern having a half-power beam width that is substantially as wide as the azimuthal width of the selected sector and dropping sharply at both azimuthal edges of that sector.

11. The antenna of claim 1 wherein the elevation-plane pattern is substantially free of nulls within the specified ground range.

12. The antenna of claim 1 wherein said horn is dimensioned to produce a ratio Δ_h/λ greater than 0.25, where $\Delta_h = [b/(2/\lambda)] \tan(\alpha_h/2)$ is the spherical-wave error of said horn in the elevation plane, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, b is the aperture height and α_h is the elevation half angle of the horn.

13. The antenna of claim 1 wherein said horn is a multi-mode horn.

14. An antenna for use in a sectorized cellular communication system, said antenna comprising

a wide-flare pyramidal horn having two pairs of opposed flared side walls, at least one of said two pairs of opposed walls having absorber-lined interior surfaces, the length of said horn and the flare angle of said walls having said absorber-lined interior surfaces being selected to produce a ratio Δ_e/λ greater than 1.5, where $\Delta_e = [a/2/\lambda] \tan (\alpha_e /2)$ is the spherical-wave error of said horn, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, a is the aperture width and α_e is the horizontal half-angle of the horn.

15. A sectorized cellular communication system comprising

multiple adjoining cells each of which has a cell site containing an antenna for transmitting signals to, and receiving signals from, users within that cell, at least some of said antennas comprising

a wide-flare pyramidal horn having two pairs of opposed flared walls, at least one of said two pairs of opposed walls having corrugated interior surfaces, the length of said horn and the flare angle of said walls having said corrugated interior surfaces being selected to produce a ratio Δ_e/λ greater than 1.5, where $\Delta_e = [a/2/\lambda] \tan (\alpha_e /2)$ is the spherical-wave error of said horn, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, a is the aperture width and α_e is the horizontal half-angle of the horn.

16. The microwave antenna of claim 15 wherein said ratio Δ_e/λ is greater than 2.

17. The microwave antenna of claim 15 wherein said ratio Δ_e/λ is greater than 2.5.

18. The microwave antenna of claim 15 wherein the E-plane walls of said horn are corrugated.

19. The microwave antenna of claim 15 wherein the H-plane walls of said horn are corrugated.

20. The antenna of claim 15 wherein both the E-plane walls and the H-plane walls of said horn are corrugated.

21. The microwave antenna of claim 15 wherein said corrugations are substantially perpendicular to the flared walls of the horn in which they are formed.

22. The microwave antenna of claim 15 wherein said corrugations are substantially perpendicular to the horn axis.

23. The microwave antenna of claim 15 which includes a rectangular waveguide connected to the small end of said horn, said waveguide optionally having stepped interior surfaces.

24. The sectorized cellular communication system of claim 15 wherein said horn is dimensioned and shaped to produce specified azimuth and elevation beam widths and patterns,

the azimuthal pattern having a half-power beam width that is substantially as wide as the azimuthal width of the selected sector and dropping sharply at both azimuthal edges of that sector.

25. The sectorized cellular communication system of claim 15 wherein the elevation-plane pattern is substantially free of nulls within the specified ground range.

26. The sectorized cellular communication system of claim 15 wherein said horn is dimensioned to produce a ratio Δ_h/λ greater than 0.25, where $\Delta_h = [b/(2/\lambda)] \tan(\alpha_h/2)$ is the spherical-wave error of said horn in the elevation plane, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, b is the aperture height and α_h is the elevation half angle of the horn.

27. The microwave antenna of claim 15 wherein said horn is a multi-mode horn.

28. A sectorized cellular communication system comprising

multiple adjoining cells each of which has a cell site containing an antenna for transmitting signals to, and receiving signals from, users within that cell, at least some of said antennas comprising

a wide-flare pyramidal horn having two pairs of opposed flared side walls, at least one of said two pairs of opposed walls having absorber-lined interior surfaces, the length of said horn and the flare angle of said walls having said absorber-lined interior surfaces being selected to produce a ratio Δ_e/λ greater than 1.5, where $\Delta_e = [a/2/\lambda] \tan(\alpha_e/2)$ is the spherical-wave error of said horn, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, a is the aperture width and α_e is the horizontal half-angle of the horn.

29. A method of designing a wide-flare pyramidal horn for use in a sectorized cellular communication system, said horn having at least one pair of opposed walls having corrugated interior surfaces, said method comprising

selecting a length for said horn and a flare angle for said walls having said corrugated interior surfaces to produce a ratio Δ_e/λ greater than 1.5, where $\Delta_e = [a/2/\lambda] \tan(\alpha_e/2)$ is the

spherical-wave error of said horn, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, a is the aperture width and α_e is the horizontal half-angle of the horn.

30. The method of claim 29 wherein said length and flare angle are selected to satisfy specified azimuth and elevation radiation patterns within a specified sector.

31. The method of claim 29 wherein said specified azimuthal pattern has a half-power beam width that is substantially as wide as the azimuthal width of the selected sector and dropping sharply at both azimuthal edges of that sector.

32. The method of claim 29 wherein said ratio Δ_e/λ is greater than 2.

33. The method of claim 29 wherein said ratio Δ_e/λ is greater than 2.5.

34. The method of claim 29 wherein the E-plane walls of said horn are corrugated.

35. The method of claim 29 wherein the H-plane walls of said horn are corrugated.

36. The antenna of claim 29 wherein both the E-plane walls and the H-plane walls of said horn are corrugated.

37. The method of claim 29 wherein said corrugations are substantially perpendicular to the flared walls of the horn in which they are formed.

38. The method of claim 29 wherein said corrugations are substantially perpendicular to the horn axis.

39. The method of claim 29 wherein a rectangular waveguide is connected to the small end of said horn, said waveguide optionally having stepped interior surfaces.

40. The method of claim 29 wherein the elevation-plane pattern is substantially free of nulls within the specified ground range.

41. The method of claim 29 wherein said horn is dimensioned to produce a ratio Δ_h/λ greater than 0.25, where $\Delta_h = [b/(2/\lambda)] \tan(\alpha_h/2)$ is the spherical-wave error of said horn in the elevation plane, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, b is the aperture height and α_h is the elevation half angle of the horn.

42. The method of claim 29 wherein said horn is a multi-mode horn.

43. A method of designing a wide-flare pyramidal horn for use in a sectorized cellular communication system, said horn having at least one pair of opposed walls having corrugated interior surfaces, said method comprising

selecting a length for said horn and a flare angle for said walls having said corrugated interior surfaces to produce a ratio Δ_e/λ greater than 1.5, where $\Delta_e = [a/2/\lambda] \tan(\alpha_e/2)$ is the spherical-wave error of said horn, λ is the free space wavelength of the microwave signals to be transmitted by said antenna, a is the aperture width and α_e is the horizontal half-angle of the horn.